**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| Applicant(s): Lavian | |
| Application No.: 09/747296 | Group Art Unit: 2419 |
| Filed: 12/22/2000 | Examiner: Lee |
| Title: Dynamic Assignment of Traffic Classes to a Priority Queue in a Packet Forwarding Device | Confirmation No. 2616 |
| Attorney Docket No.: 120-081 | |

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**APPEAL BRIEF**

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## I. Real Party in Interest

The real party in interest is Nortel Networks Limited.

## II. Related Appeals and Interferences

Appellants are not aware of any related appeals or interferences.

## III. Status of the Claims

Claims 1 and 3-24 are pending in this application. All of the pending claims are rejected. Claims 1, 3-5, 7-9, 13, and 20 are previously presented. Claims 6, 10-12, 14-19, and 21-24 are original. The rejections of claims 1, 13, and 20 are the subject of this appeal.

## IV. Status of Amendments

All submitted amendments have been entered and considered.

## V. Summary of Claimed Subject Matter

As described in the Background at page 2, variable queueing delays tend to degrade data streams associated with real-time sampling. Further, data from one source may be impeded by data from another, relatively less important source. The presently claimed invention helps to mitigate these problems by dynamically modifying packet priority. More particularly, modifying packet priority includes one or more of changing assignment of the packet traffic from a queue having a first priority to a queue having a second priority, dropping packets

of the packet traffic, copying packets of the packet traffic, diverting packets of the predetermined type in the packet traffic. The limitations recited in the independent claims are supported by the specification as indicated below in bold.

1. (previously presented) In a packet forwarding device, a method comprising:

monitoring types of packet traffic received in the packet forwarding device; **Forwarding information 110 is received from the processing unit at block 115. At block 117, the ARU stores the forwarding information in an AR table entry. At decision block 119, the physical egress port identifier stored in the AR table entry is compared against priority configuration information to determine if packets destined for the egress port have been selected for priority egress queueing. Page 11, lines 1-5. See also page 11, lines 6-23.**

determining whether a type of packet traffic received in the packet forwarding device is a unicast type or a multicast type; and **The ingress port, source MAC address or source VLAN of a packet may also be used to determine whether to queue the packet in the priority egress queue. Page 12, lines 1-3.**

when the type of packet traffic is unicast type, selectively modifying a priority of the traffic in response to a destination parameter of the packet traffic; and **Priority or best effort queueing of unicast traffic is determined based on destination parameters, e.g., egress port, destination MAC address or destination IP address, while priority or best effort queueing of multicast**

**traffic is determined based on source parameters, e.g., ingress poort, source MAC address or source IP address. Page 12, lines 3-7.**

when the type of packet traffic is multicast type, selectively modifying the priority of the traffic in response to a source parameter of the packet traffic **Id.**

wherein the step of selectively modifying the priority includes performing at least one of changing assignment of the packet traffic from a queue having a first priority to a queue having a second priority, dropping packets of the packet traffic, copying packets of the packet traffic, and diverting packets of the predetermined type in the packet traffic. **Dynamic filtering decisions may be made on how to process packets other than choosing whether they should go to a priority or best effort queue. For example, they may be dropped or copied, or traffic of a specific type as described above may be diverted. Page 21, lines 19-22.**

13. (previously presented) In a packet forwarding device, a method comprising:

monitoring environmental conditions of reception of packet traffic in the packet forwarding device; **Forwarding information 110 is received from the processing unit at block 115. At block 117, the ARU stores the forwarding information in an AR table entry. At decision block 119, the physical egress port identifier stored in the AR table entry is compared against priority configuration information to determine if packets destined for the egress port have been selected for priority egress queueing. Page 11, lines 1-5. See also page 11, lines 6-23.**

determining whether environmental conditions of reception of packet traffic in the packet forwarding device meet predetermined criteria, modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein the type of packet traffic includes unicast and multicast traffic, and wherein source parameter information is used for multicast traffic and destination parameter information is used for unicast traffic, and wherein the step of modifying includes automatically performing at least one of changing assignment of packet traffic from a queue having a first priority to a queue having a second priority, dropping packets in the packet traffic, copying packets in the packet traffic, and diverting packets in the packet traffic. **The ingress port, source MAC address or source VLAN of a packet may also be used to determine whether to queue the packet in the priority egress queue. Page 12, lines 1-3. Priority or best effort queueing of unicast traffic is determined based on destination parameters, e.g., egress port, destination MAC address or destination IP address, while priority or best effort queueing of multicast traffic is determined based on source parameters, e.g., ingress port, source MAC address or source IP address. Page 12, lines 3-7. Dynamic filtering decisions may be made on how to process packets other than choosing whether they should go to a priority or best effort queue. For example, they may be dropped or copied, or traffic of a specific type as described above may be diverted. Page 21, lines 19-22.**

20. (previously presented) In a packet forwarding device, a method comprising:

monitoring traffic patterns of packet traffic received in the packet forwarding device; **Forwarding information 110 is received from the processing unit at block 115. At block 117, the ARU stores the forwarding information in an AR table entry. At decision block 119, the physical egress port identifier stored in the AR table entry is compared against priority configuration information to determine if packets destined for the egress port have been selected for priority egress queueing. Page 11, lines 1-5. See also page 11, lines 6-23.**

determining whether traffic patterns of packet traffic in the packet forwarding device meet predetermined criteria; and **The ingress port, source MAC address or source VLAN of a packet may also be used to determine whether to queue the packet in the priority egress queue. Page 12, lines 1-3.**

when the traffic patterns of packet traffic meet the predetermined criteria, selectively modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein source parameter information is associated with multicast type packet traffic and destination parameter information is associated with unicast type packet traffic, **Priority or best effort queueing of unicast traffic is determined based on destination parameters, e.g., egress port, destination MAC address or destination IP address, while priority or best effort queueing of multicast traffic is determined based on source parameters, e.g., ingress poort, source MAC address or source IP address. Page 12, lines 3-7.**

and wherein the step of selectively modifying includes automatically performing at least one of changing assignment of at least one type of packet traffic from a queue having a first priority to a queue having a second priority, dropping packets in the packet traffic, copying packets in the packet traffic, and diverting packets in the packet traffic. **Dynamic filtering decisions may be made on how to process packets other than choosing whether they should go to a priority or best effort queue. For example, they may be dropped or copied, or traffic of a specific type as described above may be diverted. Page 21, lines 19-22.**

## VI. Grounds of Rejection to be Reviewed on Appeal

A. Claims 1 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,094,435 (Hoffman) in view of US 6,870,840 (Hill).

## VII. Argument

### A. The cited combination fails to teach or suggest dynamic modification of priority level.

Three basic criteria must be met in order to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art references must teach or suggest all the claim

limitations. (MPEP §2143) As will be explained below, the cited combination of references at least fails to teach or suggest all of the claim limitations.

With regard to independent claims 1, 13 and 20, the Examiner concedes that Hoffman fails to disclose selectively modifying priority in response to a parameter of the packet traffic.[1] However, the Examiner asserts that Hill discloses the limitation at figure 4, column 6, lines 19-33, figure 4, column 6, lines 19-33, figure 3, column 4, lines 20-23, column 3, lines 44-51, and column 4, lines 22-45. The large extent of the text cited against such a straightforward claim limitation should give the Board reason to question the accuracy and conciseness of the rejection, and such doubt will be shown to be justified upon reviewing the cited passages and figures. The cited passages and figures from Hill simply describe and illustrate a forwarding operation that includes a lookup function. A similar example of a lookup function is described with reference to the queue fill logic in this application at page 8, lines 1-11, with reference to figure 2A. In both examples the QID examines the packet header to determine whether to allocate an entry in a particular priority queue based on the result of the lookup. The procedure does not change priority. Rather, the lookup function simply implements a decision that has already been made, i.e., it implements a priority level already assigned by another function. Figure 4 of this application illustrates the procedure for actually determining priority when storing an entry in an address resolution table. Note that the description of that figure at page 12,

[1] The Examiner asserts in the "response to arguments" that the limitations are implicitly disclosed, but fails to provide any argument in support of the assertion.

lines 3-7 states "priority or best effort queuing of unicast traffic is determined based on destination parameters (e.g., egress port, destination MAC address or destination IP address), while priority or best effort queuing of multicast traffic is determined based on source parameters (e.g., ingress port, source MAC address or source IP address)." In other words, the priority is set when the entry is stored in the address resolution table. However, determining priority when the entry is stored is insufficient because such *a priori* priority decisions may sometimes yield an undesirable result, i.e., the problem which the invention helps to solve. Accordingly, dynamic priority modification as described at page 15, line 12 through page 16, line 9, with reference to figure 6 is utilized to adjust operation in response to existing conditions. Note that the claims recite the dynamic priority modification feature, i.e., dynamically changing the predetermined priority level in response to existing conditions. It should therefore be understood that the lookup function cited by the examiner is not analogous to the recited limitations.

The points described above have been repeatedly argued, but the Examiner has not given patentable weight to modifying a priority value, i.e., from one value to a different value, versus assigning a priority value, i.e., from no value to some value. Further, the Examiner mistakenly interprets implementing a predetermined priority value as being equivalent to modifying a priority value based on monitored conditions. For example, in the "response to arguments" in the final Office Action dated January 8, 2009 the Examiner cites different passages of Hill (columns 15-18) against the same limitations.

However, the cited passages not only fail to support the rejection, but even contradict the rejection. For example, at column 15, line 65 through column 16, line 2, Hill states that the output port need not make any modifications to the header except for inserting the MAC address and computing a new packet checksum when routing unicast or multicast packets. That statement effectively undermines the Examiner's counter argument that the passages teach "selectively modifying priority in response to the destination parameter of the packet traffic when the type of packet traffic is unicast type, and selectively modifying the priority in response to a source parameter of the packet traffic when the type of packet traffic is multicast type."

The distinguishing limitations discussed above are recited in the independent claims as follows. Claim 1 recites "when the type of packet traffic is unicast type, selectively modifying a priority of the traffic in response to a destination parameter of the packet traffic; and when the type of packet traffic is multicast type, selectively modifying the priority of the traffic in response to a source parameter of the packet traffic." (emphasis added) Claim 13 recites "modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein the type of packet traffic includes unicast and multicast traffic, and wherein source parameter information is used for multicast traffic and destination parameter information is used for unicast traffic." (emphasis added) Claim 20 recites "selectively modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein source parameter

information is associated with multicast type packet traffic and destination parameter information is associated with unicast type packet traffic." (emphasis added) Because the cited combination of references fails to teach or suggest any such modification of priority, the rejections of claims 1, 13 and 20 should be reversed.

**B. The cited combination fails to teach or suggest selectively modifying priority in response to the destination parameter of the packet traffic when the type of packet traffic is unicast type, and selectively modifying the priority in response to a source parameter of the packet traffic when the type of packet traffic is multicast type.**

Even if the cited combination were somehow interpreted as teaching modification of priority level, the combination certainly fails to disclose the more specific limitations of selectively modifying priority in response to the destination parameter of the packet traffic when the type of packet traffic is unicast type, and selectively modifying the priority in response to a source parameter of the packet traffic when the type of packet traffic is multicast type. The passages and figures from Hill cited by the Examiner fail to make any priority distinction based specifically on whether the packet is unicast or multicast. Note that in figure 3 of Hill, step (361) summarily states that the QID defines the priority. No additional detail is provided in the specification.

There is no suggestion that priority should be set **differently** depending on whether the packet is unicast or multicast as recited in the claims.

It should also be noted that the passages and figures from Hill cited by the Examiner fail to make any priority determination based on destination parameters in the case of unicast packets, and source parameters in the case of multicast packets. Indeed, the Examiner appears to have ignored or overlooked these limitations. As described in the specification at page 12, lines 3-7, "priority or best effort queuing of unicast traffic is determined based on **destination parameters (e.g., egress port, destination MAC address or destination IP address)**, while priority or best effort queuing of multicast traffic is determined based on **source parameters (e.g., ingress port, source MAC address or source IP address)**." (emphasis added) No such distinction is disclosed in Hill.

## VIII. Conclusion

The rejections are improper for at least the reasons set forth above. Appellants accordingly request that the rejections be reversed and the application put forward for allowance.

Respectfully submitted,

/Holmes W. Anderson/
Holmes W. Anderson
Reg. No. 37,272
Attorney for Assignee

Date: March 3, 2009

Anderson Gorecki & Manaras LLP
33 Nagog Park
Acton MA 01720
(978) 264-4001

## *Appendix A - Claims*

1. (previously presented) In a packet forwarding device, a method comprising:

monitoring types of packet traffic received in the packet forwarding device;

determining whether a type of packet traffic received in the packet forwarding device is a unicast type or a multicast type; and

when the type of packet traffic is unicast type, selectively modifying a priority of the traffic in response to a destination parameter of the packet traffic; and

when the type of packet traffic is multicast type, selectively modifying the priority of the traffic in response to a source parameter of the packet traffic

wherein the step of selectively modifying the priority includes performing at least one of changing assignment of the packet traffic from a queue having a first priority to a queue having a second priority, dropping packets of the packet traffic, copying packets of the packet traffic, and diverting packets of the predetermined type in the packet traffic.

2. (cancelled)

3. (previously presented) The method of claim 1, wherein the source parameter includes a source MAC address.

4. (previously presented) The method of claim 1, wherein the source parameters includes a source VLAN.

5. (previously presented) The method of claim 1, wherein the type of packet traffic is associated with its ingress port.

6. (original) The method of claim 1, wherein the type of packet traffic is based on its destination.

7. (previously presented) The method of claim 6, wherein the destination parameter includes a destination MAC address.

8. (previously presented) The method of claim 6, wherein the destination parameter includes a destination VLAN.

9. (previously presented) The method of claim 1, wherein the type of packet traffic is associated with its egress port.

10. (original) The method of claim 1, wherein the type of traffic is based on its protocol.

11. (original) The method of claim 10, wherein the protocol of traffic includes FTP.

12. (original) The method of claim 10, wherein the protocol of traffic includes HTTP.

13. (previously presented) In a packet forwarding device, a method comprising: monitoring environmental conditions of reception of packet traffic in the packet

forwarding device; determining whether environmental conditions of reception of packet traffic in the packet forwarding device meet predetermined criteria, modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein the type of packet traffic includes unicast and multicast traffic, and wherein source parameter information is used for multicast traffic and destination parameter information is used for unicast traffic, and wherein the step of modifying includes automatically performing at least one of changing assignment of packet traffic from a queue having a first priority to a queue having a second priority, dropping packets in the packet traffic, copying packets in the packet traffic, and diverting packets in the packet traffic.

14. (original) The method of claim 13, wherein the environmental conditions meeting the predetermined criteria include time of day.

15. (original) The method of claim 13, wherein the environmental conditions meeting the predetermined criteria include network configuration changes.

16. (original) The method of claim 15, wherein the network configuration changes include network failures.

17. (original) The method of claim 15, wherein the network configuration changes include network congestion.

18. (original) The method of claim 13, wherein the environmental conditions meeting the predetermined criteria include network error rates.

19. (original) The method of claim 13, wherein the environmental conditions meeting the predetermined criteria include line use of high level protocols.

20. (previously presented) In a packet forwarding device, a method comprising:
monitoring traffic patterns of packet traffic received in the packet forwarding device;
determining whether traffic patterns of packet traffic in the packet forwarding device meet predetermined criteria; and
when the traffic patterns of packet traffic meet the predetermined criteria, selectively modifying a priority of the packet traffic using parameter information associated with a type of packet traffic, wherein source parameter information is associated with multicast type packet traffic and destination parameter information is associated with unicast type packet traffic, and wherein the step of selectively modifying includes automatically performing at least one of changing assignment of at least one type of packet traffic from a queue having a first priority to a queue having a second priority, dropping packets in the packet traffic, copying packets in the packet traffic, and diverting packets in the packet traffic.

21. (original) The method of claim 20, wherein at least some of the traffic patterns are based on specified source ports.

22. (original) The method of claim 20, wherein at least some of the traffic patterns are based on specified destination ports.

23. (original) The method of claim 20, wherein at least some of the traffic patterns are based on specified source MAC addresses.

24. (original) The method of claim 20, wherein at least some of the traffic patterns are based on specified IP flows.

## *Appendix B - Evidence Submitted*

None.

## *Appendix C - Related Proceedings*

None.